repeatedly generating an alarm message informing a user that a battery voltage is insufficient to normally activate said external communication terminal when said difference voltage is lower than said inoperable voltage threshold, until said external communication terminal is turned off.

11. The method as claimed in claim 7, wherein a voltage drop according to the power consumption of said external communication terminal is previously tabled in a ROM of the personal digital assistant.

12. The method as claimed in claim 8, wherein said alarm message is generated through at least one of a display and a speaker.

REMARKS

This Amendment, submitted in response to the Office Action dated October 15, 1999, is believed to be fully responsive to each point of rejection raised therein. Accordingly, favorable reconsideration on the merits is respectfully requested.

As preliminary matters, the Examiner has objected to the title as not being descriptive of the invention. A revised title is set forth above. The Examiner has further requested that copies of the references described in page 1 of the specification be forwarded with the response to this Office Action. Applicant submits there are no publications describing the subject matter at page 1 of the application.

Turning to more substantive matters, claims 1-6 remain pending in the application and have been rejected under 35 U.S.C. § 103 as being unpatentable over Rao et al. (U.S.P. 5,159,272, hereinafter "Rao") in view of Nguyen (U.S.P. 5,797,089). Applicant hereinabove amends the claims to describe the invention more particularly. Applicant further respectfully submits the following arguments in traversal of the prior art rejections.

Applicant's invention relates to a power management method for a personal digital assistant (PDA) which can be connected to an external communication terminal. Conventional PDAs can have various utilities such as an address book, telephone directory, scheduler and terminals for PC and facsimile communications. With the wide variety of uses, the PDAs may become overloaded due to inadequate power supply voltage.

Applicant's invention overcomes the above deficiencies. Fig. 2 illustrates a preferred embodiment of the invention. When an external terminal of the PDA is turned on, a CPU of the PDA determines the battery voltage Vc. This value is compared to Vo, which is a voltage slightly higher than a threshold voltage at which the PDA cannot operate normally. If the battery voltage Vc is lower than voltage Vo, the CPU generates a low-voltage alarm message and cuts off power to the PDA. The battery voltage is also compared with the inoperability threshold voltage Vi. If the battery voltage Vc is less than Vi, the PDA is set in sleep mode. If at step 204, the battery voltage is above the alarm voltage Vo, the voltage drop of the external terminal Ve is read and the difference between the battery voltage Vc and the voltage drop Ve is calculated. If this difference is greater than the inoperability threshold voltage Vi, then power is supplied to the external terminal and the above process, beginning with the detection of Vc (step 202) repeats

itself. If the difference is less, an alarm signal is generated and it is continually determined whether the external terminal is turned off. Once the turn off is detected, the power is shut off to the external terminal.

Turning to the cited art, Rao relates to a battery monitoring device which separately determines whether a discharged automotive battery can be recharged or is unhealthy and impending on a failure state where recharge is not possible. Fig. 3 illustrates the battery monitoring device. With the engagement of a starter motor, a first detector determines whether the voltage of the battery in an open circuit mode drops to below 5.6 volts in a closed circuit operation. If so, the battery is determined to be in a state of impending failure and an indicator 14 is enabled to signal this condition. Col. 7, lines 60-67. If the open circuit voltage falls below 11.8 volts, as detected by detector 49, then the low battery indicator 13 is indicated. Col. 8, lines 1-4. If the voltage remains below 11.8 volts for over a predetermined time, e.g. five seconds, then a failure memory 46 is disabled to prevent a false reading of impending failure, when in reality, the car battery is merely undergoing a slow discharge. This may occur when a driver leaves the vehicle headlights on after the engine is shut off. Col. 7, line 60 to col. 8, line 37. The detector 45 determines when the battery voltage drops below 10V, which signals ignition of the connected starter motor. The memory 46 is initialized under this condition, ready to record an impending failure condition. Col. 7, lines 51-58. The start detector 45 and the failure detector 47 operate in short intervals corresponding to an engine start. Col. 8, lines 49-53.

Nguyen relates to a PDA with switches to independently energize a mobile phone and the PDA. An open position sensor triggers determinations of whether the mobile phone and/or the

PDA are turned on. Once powered, certain functions of each device can be activated. However, there is no voltage detection made at this juncture. See col. 6, line 45 to col. 7, line 21. The PDA sensor 35 merely determines a mechanical status of the PDA and mobile phone, not an electrical status. The low power supply is an auxiliary to the PDA in the event the high power supply is low. Col. 4, lines 50-55. However, Nguyen is silent as to the determination of high and low supply voltages.

The Examiner maintains that Rao teaches each feature of independent claim 1, except for the detection of a power-on of the external communication terminal and detection of the PDA battery voltage. The Examiner cites Nguyen to make up for this deficiency. The Examiner's rejection is not supported for at least the following reasons.

First, as an initial matter, Rao is not drawn from analogous art and therefore may not be properly applied to the present invention. In order for a reference to qualify as analogous art, one of two conditions must be met. The reference must be drawn from the same field of endeavor as the present invention. Alternatively, the reference must be reasonably pertinent to the problem addressed by the invention. MPEP 2141.01(a). With regard to the first test, Rao relates to the automotive arts, in particular, a battery voltage gauge for a starter motor. By contrast, Applicant's invention relates to portable communication devices. Therefore, Rao and the present invention are clearly drawn from different fields of endeavor. With regard to the second test, the battery gauge for an automobile starter must work in short intervals to avoid damage to the starter. Power is cut off to the starter motor and detector once start up is complete. This is clear from the teachings of Rao. Col. 8, lines 49-53. By contrast, the claimed battery

monitor is for a communications device and peripheral equipment which is monitored over a longer period of time. The instantaneous monitoring that must occur in Rao is not relevant to the longer term monitoring that must occur in the invention. Therefore, Rao may not be applied to the present claims for at least this reason.

Second, even assuming *arguendo* that Rao and Nguyen may be properly combined, their combination does not teach each feature of independent claim 1. The Examiner correctly concedes that Rao does not teach voltage detection upon power up of a PDA device. The Examiner relies on elements of Nguyen to make up for this deficiency, such as the low voltage power source, the high voltage power source, a "PDA" open sensor and a power on detector. However, the PDA sensor merely detects a mechanical, not an electrical condition and thus is irrelevant to the independent claims. See, Col. 3, lines 47-55. This does not correspond to a power on/off detector. The power on detecting step (Fig. 4, element 65) is not accompanied by any battery voltage check as described by the claim. Rather, the PDA power check is accompanied by a determination of what type of functions have been activated. Fig. 4, steps 67, 69 and 71. Therefore, claim 1 is patentable for at least this reason. Because claims 2 and 4 are dependent on upon claim 1, these claims are patentable for at least the reasons set forth above for the independent claim.

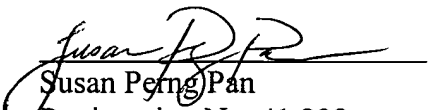
Applicant adds claims 7-12 to describe the invention more particularly. These claims describe, inter alia, that when a voltage difference is above a reference threshold, supply of electric power is provided to the external communication terminal. By contrast, in Rao, the detectors only provide a result if the battery voltage is less than the threshold by turning on an

indicator. If the result is above the threshold is exceeded, there is no teaching that voltages are supplied to an external terminal. The Examiner may not rely on the probability of such an occurrence to support the prior art rejection. Continental Can v. Monsanto Co., 49 USPQ2d 1746, 1749 (Fed. Cir. 1991).

In view of the above, Applicant submits that claims 1, 2, 4 and 7-12 are in condition for allowance. Therefore it is respectfully requested that the subject application be passed to issue at the earliest possible time. The Examiner is requested to contact the undersigned at the local telephone number listed below to discuss any other changes deemed necessary.

Applicant hereby petitions for any extension of time which may be required to maintain the pendency of this case, and any required fee, except for the Issue Fee, for such extension is to be charged to Deposit Account No. 19-4880.

Respectfully submitted,



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